

WHAT IS CLAIMED IS:

1. A refrigerant supply apparatus for supplying a refrigerant to a cooling target, the apparatus comprising:

5 a refrigerant supply channel through which pure water as the refrigerant is supplied to the cooling target; and

an impurity removing unit disposed in an impurity removing channel which is a channel different from said
10 refrigerant supply channel.

2. The apparatus according to claim 1, further comprising a pure water tank which stores the pure water,

wherein an upstream side of said refrigerant
15 supply channel is connected to said pure water tank, and

said impurity removing channel circulates the pure water through said pure water tank.

3. The apparatus according to claim 2, wherein a
20 lower portion of said pure water tank has a tapered shape.

4. The apparatus according to claim 2, further comprising an oxygen removing mechanism which removes dissolved oxygen in the pure water by supplying an
25 inert gas into said pure water tank.

5. The apparatus according to claim 4, wherein said oxygen removing mechanism supplies the inert gas into

the pure water in said pure water tank.

6. The apparatus according to claim 1, wherein said impurity removing unit includes at least one of an ion exchange resin, active carbon, a filtration film, a reverse osmosis film, a distillation unit, and a deaeration film.

7. The apparatus according to claim 1, further comprising a germicidal lamp which sterilizes the pure water.

8. The apparatus according to claim 1, further comprising:

a sensor which measures a purity of the pure water; and

a valve which stops supply of the pure water to the cooling target when the purity of the pure water does not satisfy a predetermined standard.

9. The apparatus according to claim 8, further comprising:

a first pump provided to said refrigerant supply channel; and

a second pump provided to said impurity removing channel,

wherein said first and second pumps are controlled independently of each other, such that said first pump is stopped when the purity of the pure water does not satisfy the predetermined standard, and that said second pump is stopped when the purity of the pure

water satisfies the predetermined standard.

10. The apparatus according to claim 8, wherein said sensor includes a resistivity sensor.

11. The apparatus according to claim 8, wherein said
5 sensor includes a dissolved oxygen sensor.

12. The apparatus according to claim 1, further comprising a temperature adjustment unit which adjusts a temperature of the pure water.

13. A device manufacturing apparatus comprising the
10 refrigerant supply apparatus defined in claim 1 as part of a cooling apparatus.

14. An exposure apparatus comprising the refrigerant supply apparatus defined in claim 1 as part of a cooling apparatus.

15 15. A device manufacturing apparatus comprising:
a driving section which generates heat;
a refrigerant supply channel through which pure
water as a refrigerant is supplied to a cooling section
that cools said driving section;

20 a sensor which is disposed in said refrigerant supply channel and measures a purity of the pure water;
and

a controller which controls supply of the pure water to said cooling section on the basis of the
25 purity of the pure water measured by said sensor.

16. The apparatus according to claim 15, wherein said controller stops supply of the pure water to said

cooling section when the purity of the pure water does not satisfy a predetermined standard.

17. The apparatus according to claim 15, wherein said sensor includes a resistivity sensor.

5 18. The apparatus according to claim 15, wherein said sensor includes a dissolved oxygen sensor.

19. The apparatus according to claim 15, further comprising an impurity removing unit which removes impurities in the pure water.

10 20. The apparatus according to claim 19, wherein said impurity removing unit is disposed in an impurity removing channel which is a channel different from said refrigerant supply channel.

21. The apparatus according to claim 20, further
15 comprising:

a first pump provided to said refrigerant supply channel; and

a second pump provided to said impurity removing channel,

20 wherein said first and second pumps are controlled independently of each other, such that said first pump is stopped when the purity of the pure water does not satisfy the predetermined standard, and that said second pump is stopped when the purity of the pure
25 water satisfies the predetermined standard.

22. The apparatus according to claim 19, wherein said impurity removing unit is disposed in a branch channel

of said refrigerant removing channel.

23. The apparatus according to claim 19, wherein said impurity removing unit includes at least one of an ion exchange resin, active carbon, a filtration film, a reverse osmosis film, a distillation unit, and a deaeration film.

24. The apparatus according to claim 15, further comprising a germicidal lamp which sterilizes the pure water.

25. The apparatus according to claim 15, further comprising a pure water tank which stores the pure water, wherein an upstream side of said refrigerant supply channel is connected to said pure water tank.

26. The apparatus according to claim 25, wherein a lower portion of said pure water tank has a tapered shape.

27. The apparatus according to claim 25, further comprising an oxygen removing mechanism which removes dissolved oxygen in the pure water by supplying an inert gas into said pure water tank.

28. The apparatus according to claim 27, wherein said oxygen removing mechanism supplies the inert gas into the pure water in said pure water tank.

29. The apparatus according to claim 15, further comprising a temperature adjustment unit which adjusts a temperature of the pure water.

30. The apparatus according to claim 15, which is

formed as an exposure apparatus.

31. A device manufacturing method including a step of processing a substrate using the device manufacturing apparatus according to claim 15.

- 5 32. A device manufacturing method including steps of:
transferring a pattern to a substrate with the device manufacturing apparatus according to claim 30;
and
developing the substrate.

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